# The Engineering of Flight
## Wright-Patterson Air Force Base

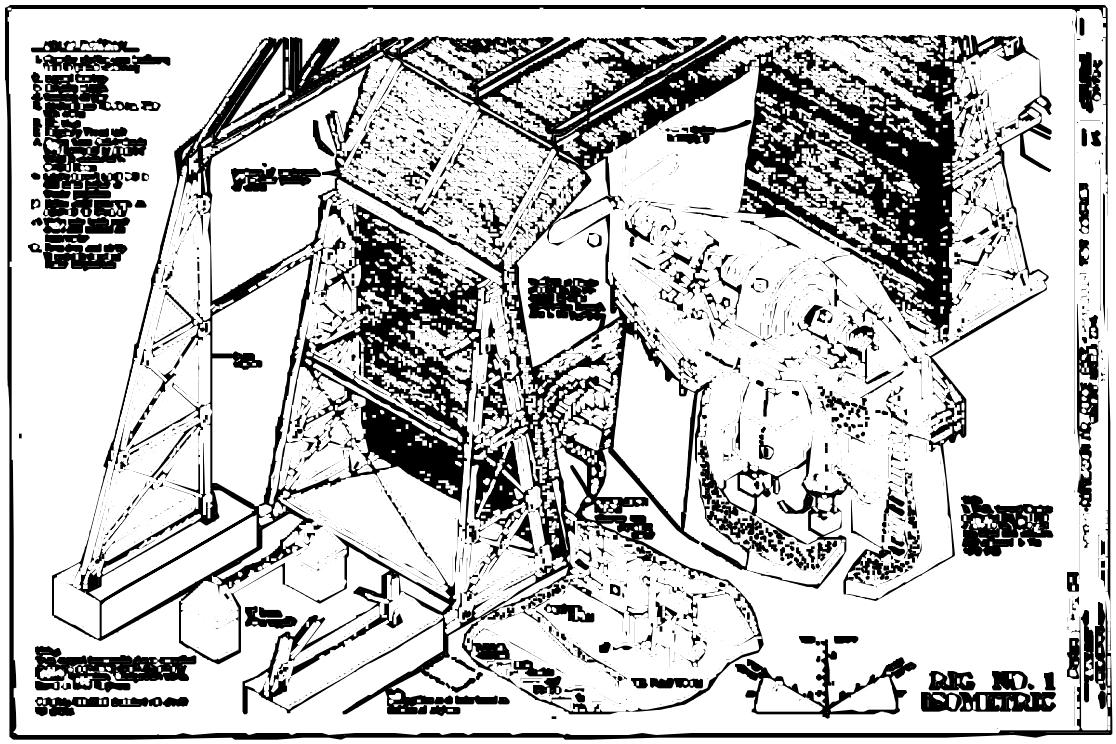
**Amy Slaton**

HAER is best known for its documentation of traditional historic American technology, such as factories, canals, machine shops, bridges, and railroad facilities. These sites and structures are fortunately still very much a part of the American landscape, and will continue to be documented by HAER, but as technologies that we consider more modern also begin to age, HAER is developing an increasing number of projects to record these new sites. One such project has been the documentation of aeronautical engineering facilities at Wright-Patterson Air Force Base, located near Dayton, OH.

In the summer of 1991, HAER placed a team of six architects, two historians, and a photographer on Wright-Patterson Air Force Base, to research and record the historic aeronautical engineering features of the most historic section of the base, the old Wright Field, now known as Area B. Wright Field was constructed in 1926, and was the home of the Army Air Corps' fledgling Materiel Division. Even though aeronautical engineering activities have continued on the base to the present, HAER was most interested in structures and machinery dating from the early days of aeronautical engineering, the 1920s through the 1940s. HAER was initially invited to Wright-Patterson Air Force Base by the base's Office of Environmental Management and its Historic Preservation Officer, Chris Widener. The project was sponsored by that office and the Aeronautical Systems Center of Area B. HAER was given additional funding in September of 1991 to continue its documentation of Area B through September of 1992. Throughout the project,

**Propeller Test Rig, Area B, Wright-Patterson Air Force Base, Ohio. Photo by David Diesing, 1991, HAER.**

the team has worked closely with Jan Ferguson, the base's current preservation officer. When the project is complete, HAER will have comprehensively documented the site through the production of 45 sheets of drawings, 250 photographs, 2 brochures, and a published inventory of structures and a historical overview.




**Propeller Test Rig No. 1, Area B, Wright-Patterson Air Force Base, Ohio. Delineated by Charissa Y. Wang, 1991, HAER.**

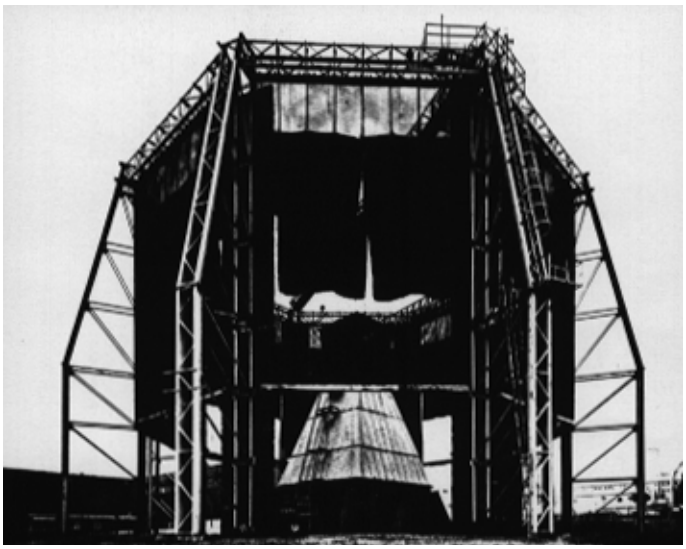
The Army established Wright Field in 1926 to accommodate its experimental aeronautical engineering activities. The many tasks associated with developing a new aircraft—the design and testing of whole airplanes, parts, and equipment ranging from flight suits to aerial cameras to bombsights—demanded specialized structures and a complex infrastructure. HAER's architects and historians examined buildings, laboratory equipment, and the organization of the site, using as a reference a historic structures inventory prepared by the base in association with the Ohio Historic Preservation Office. The HAER documentation was conducted using

Army Air Corps (later the Air Force) publications (including technical drawings, annual reports, and newsletters); individual departmental histories; and trade journals in which the findings of the Materiel Division were disseminated to the public. Oral history interviews with current and former employees of the Division also helped in establishing the intentions and practices of Army aeronautical engineers.

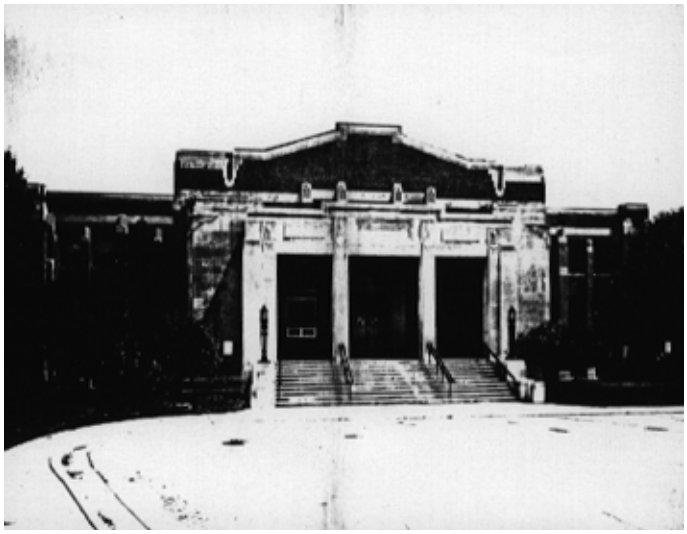
While HAER's architects and historians recreated the original form and content of Wright Field buildings and the design of early testing facilities, other HAER historians focused on associating the physical environment with contemporary conceptions of military air power. The decision to build Wright Field accompanied expanding public confidence in aviation as a military and commercial tool. As private aircraft manufacturers proliferated in the 1920s, Congress designated funds for an experimental station in which to test the aviation products created by industry for military application. Wright Field (replacing the smaller, temporary McCook Field of 1917), provided ample laboratory space, shops, hangars, and runways, as well as sophisticated wind tunnels and propeller and engine testing facilities.

Examining the layout of the installation itself, HAER historians found that the Army's approach to engineering aircraft displayed notable consistencies over the course of the century. Post-World War II Air Force policy articulates a "systems" approach to aircraft engineering, calling for all aspects of a plane's development to be coordinated. In fact, this approach is reflected in the earliest layout of Wright Field, in which laboratories for engine, propeller, instrument, and pilot safety investigations were all built in close proximity. The Main Laboratory building of 1929, a 150,000 square foot space, was designed expressly to allow communication between different engineering specialists.

HAER historians and architects together documented the complicated testing equipment developed by the Army Air Corps. Immensely powerful propeller whirl rigs and wind tunnels (most of which are no longer intact) were used at Wright Field before and during World War II. In final form these were unlike any found elsewhere, but part of HAER's analysis of this equipment was to determine which aspects had been borrowed from existing aeronautical technologies, and which were devised to suit the specific needs of Wright Field's projects. This analysis placed Wright Field's facilities in their historical scientific context, and also illuminated the budgetary and administrative constraints operating on Air Corps engineers at different times.



**Rotor Test Stand, Area B, Wright-Patterson Air Force Base, Ohio. Photo by David Diesing, 1991, HAER.**



**Technical Data Building, Area B, Wright-Patterson Air Force Base, Ohio. Photo by David Diesing, 1991, HAER.**

The nature of construction styles at Wright Field also reflected the conditions under which the military worked. The original buildings of Wright Field were of a very consistent appearance: almost all were red-brick structures with large expanses of metal-framed windows and low peaked roofs. During the Great Depression, the Army relied on Works Progress Administration (WPA) funding for new construction. The lavishly decorated Technical Data Building dates from this period.

World War II brought still another building style to the field. The installation grew from some 40 structures to more than 300 in the course of the war, and pressures of time and scarcity of materials and labor brought the use of poured concrete to the site. Offices, hangars, and laboratory buildings were built quickly in simple, streamlined fashion. In addition to the engineering features of Area B, the HAER teams also documented these changing architectural styles and construction technologies.

The policies and physical conditions of aeronautical engineering at Wright Field between the late 1920s and the 1950s were shaped by the American scientific and political climate. HAER's documentation of the site offers substantial data for historians of the military, architecture, engineering and the social history of the country during this period. The information gathered by HAER teams at Wright-Patterson Air Force Base will be available to the general public through the transmittal of HAER documentation to the Library of Congress, and through the publication of an inventory and two brochures.

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Amy Slaton was project historian during the summer of 1992 for HAER's Wright-Patterson Air Force Base Recording Project. She is a Ph.D. candidate in the History and Sociology of Science at the University of Pennsylvania.